

TROPICAL ATMOSPHERE-OCEAN (TAO) PROGRAM
FINAL CRUISE REPORT
KA-08-07

Area: Equatorial Pacific between 9°N and 5°S latitude along 140°W Longitude and 8°S to 8°N Latitude along 125°W Longitude.

Itinerary:

KA-08-07	<i>Honolulu, HI</i>	DEP	<i>October 13, 2008</i>
	<i>Bellingham, WA</i>	ARR	<i>November 24, 2008</i>

CRUISE DESCRIPTION

The Tropical Atmosphere Ocean (TAO) array consists of 70 buoys utilizing a taut line mooring configuration used to mount data collection sensors for climate research purposes. Fifteen buoys are serviced by JAMSTEC and the remaining 55 buoys from 95°W longitude to 165°E longitude are serviced by National Data Buoy Center (NDBC). Repair and maintenance of the buoys is performed by NDBC contracted personnel on an annual basis utilizing the NOAA Ship KA'IMIMOANA and NOAA Ship RONALD H. BROWN. The buoy deployment lifecycles are up to 18 months to ensure at least one year of data collection can be completed.

TAO Project Points of Contact:

TAO Program Manager

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TAO Cruise Objective and Plan:

The objective of this cruise was the maintenance of the TAO Array along the 140°W and 125°W meridians. The scientific complement for the cruise embarked at *Honolulu, HI* on *October 12, 2008*. The ship departed on *October 13, 2008* and conducted operations on the 140°W and 125°W lines as listed in Section 2.1. The ship arrived in *Bellingham, WA* on *November 24, 2008*.

1.0 PERSONNEL

1.1 CHIEF SCIENTIST AND PARTICIPATING SCIENTISTS:

Chief Scientist: Ezzard Charles

Participating Scientists:

Name	Gender	Nationality	Affiliation
Ezzard Charles	M	US	NOAA/NDBC
James Rauch	M	US	NOAA/NDBC
Alan Lossett	M	US	NOAA/NDBC

2.0 OPERATIONS

2.1 TAO Data Recovery Summary

Mooring Operations conducted are shown in the table below. Operations were conducted from *9N 140W* to *5S 140W* and *8S 125W* to *8N 125W*). Due to mechanical problems encountered during this cruise, not all operational objectives were met. The following provides details on the data recovery efforts for the buoys serviced. All noted time in the summary reports is Coordinated Universal Time (UTC):

9N 140W

Buoy ID: PM742		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4824 m	
Deployed Location: 8-59.755N 140-15.669W		Repair Location: 8-59.604N 140-16.105W	
Buoy Start Date: 5/6/08		Buoy End Date: Still deployed.	
Service Description: Repair. Replaced anemometer.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations

Wind	5/6/08	WDIR off ~60 degrees	
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5N 140W

Buoy ID: PM702B		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4483 m	
Deployed Location: 4-59.3N 139-58.0W		Recovery Location: 5-0.99N 139-58.4W	
Buoy Start Date: 9/28/07		Buoy End Date: 10/22/08	
Service Description: Recovery/Deployment. SSC missing top poison puck. Module T100 lost. All other subsurface instruments downloaded successfully. Knot is Nilspin at ~60m. Longline fishing gear fouled in nylon.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
Wind	5/18/08	WSPD stuck on 0	

2N 140W

Buoy ID: PM704		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4370 m	
Deployed Location: 1-58.6N 140-1.249W		Recovery Location: 1-59.786N 140-7.912W	
Buoy Start Date: 9/29/07		Buoy End Date: 10/24/08	
Service Description: Recovery/Deployment. Module TP300 lost. All other instruments downloaded successfully.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
RH	1/20/08	Data too low then missing	
Salinity	3/27/08	Data too high	
ATMP	5/19/08	Data too low	

0 140W

Buoy ID: PM743		Buoy Configuration: Flux	
Buoy Type: ATLAS		Water Depth: 4350 m	
Deployed Location: 0-0.75N 139-52.313W		Repair Location: 0-1.32N 139-51.79W	
Buoy Start Date: 5/10/08		Buoy End Date: Still deployed	
Service Description: Repair. Replaced SWR and LWR sensors that were Lost at Sea.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations

SWR	5/19/08	Missing	
LWR	6/10/08	Missing	

0 140W ADCP

Buoy ID: CAO13		Buoy Configuration: Standard	
Buoy Type: ADCP		Water Depth: 4043 m	
Deployed Location: 0-2.8742N 140-1.217W		Recovery Location: 0-2.8742N 140-1.217W	
Buoy Start Date: 9/30/07		Buoy End Date: 10/25/08	
Service Description: Recovery/Deployment. Routine recovery. All sensors downloaded successfully.			
Site Sensor Failures	Date Sensors Failed	Why sensors were failed	Field Service Observations
None			

2S 140W

Buoy ID: PM706B		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4337 m	
Deployed Location: 2-0.33S 139-58.59W		Recovery Location: 1-59.528S 139-59.819W	
Buoy Start Date: 10/2/07		Buoy End Date: 10/27/08	
Service Description: Recovery/Deployment. Anemometer had corroded connector and frozen bearings. All subsurface instruments downloaded successfully.			
Site Sensor Failures	Date Sensors Failed	Why sensors were failed	Field Service Observations
Rain	11/1/08	Missing	
Wind	11/4/08	WSPD stuck on 0	

5S 140W

Buoy ID: PM744		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4360 m	
Deployed Location: 4-59.9S 139-54.6W		Visit Location: 4-58.7S 139-55.3W	
Buoy Start Date: 5/13/08		Buoy End Date: Still deployed	
Service Description: Visit. Rain gauge appears to be leaning slightly			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
None			

8S 125W

Buoy ID: PM745		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4505 m	
Deployed Location: 7-59.0N 124-58.2W		Recovery Location: 7-59.34S 124-59.935W	
Buoy Start Date: 5/19/08		Buoy End Date: 11/7/08	
Service Description: Recovery/Deployment. Temperature sensors T2-T8 were setup incorrectly and did not record data. All other sensors were downloaded successfully.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
T2 – T8	5/19/08	Incorrect Setup	

5S 125W

Buoy ID: PM746		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4547 m	
Deployed Location: 4-59.3S 124-56.1W		Visit Location: 4-59.513S 124-56.93W	
Buoy Start Date: 5/21/08		Buoy End Date: Still Deployed	
Service Description: Visit. Buoy appears to be riding well with no problems.			
Site Sensor Failures	Date Sensors Failed	Why sensors were Failed	Field Service Observations
T60	5/21/08	Data erratic & high	

0 125W

Buoy ID: PM709B		Buoy Configuration: Standard	
Buoy Type: ATLAS		Water Depth: 4792 m	
Deployed Location: 0-9.884S 124-23.917W		Recovered Location: 0-10.136S 124-23.927W	
Buoy Start Date: 10/16/07		Buoy End Date: 11/10/08	
Service Description: Recovery/Deployment. Modules T20 and TP300 were lost. All other sensors were downloaded successfully.			
Site Sensor Failures	Date Sensors Failed	Why sensors were failed	Field Service Observations
None			

2.2 CTD Casts Completed

A Sea-Bird 911plus CTD with dual temperature and conductivity sensors was provided by the NMAO. Temperature and conductivity sensors are calibrated yearly at Sea-Bird and sent in for diagnostics as necessary. A Sea-Bird 12-position carousel and twelve 5-liter Niskin bottles were used to collect water samples for the analysis of salinity.

The following outlines the CTD casts completed during the cruise:

CTD Operations		
Site	Date	Comments
9N 140W	10/20/08	3000 m
8N 140W	10/21/08	1000 m
5N 140W	10/22/08	1000 m
4N 140W	10/23/08	1000 m
3N 140W	10/24/08	1000 m
2N 140W	10/26/08	1000 m
0 140W	10/27/08	3000 m
2S140W	10/28/08	1000 m
3S 140W	10/28/08	1000 m
4S 140W	10/29/08	1000 m
5S 140W	10/29/08	3000 m
8S 125W	11/8/08	3000 m
5S 125W	11/8/08	1000 m
4S 125W	11/9/08	1000 m
3S 125W	11/9/08	1000 m
2S 125W	11/9/08	1000 m
1S 125W	11/9/08	1000 m
0 125W	11/10/08	3000 m
0 125W	11/12/08	3000 m

2.3 Ancillary Science Projects Completed on the Cruise

The following outlines the ancillary science work performed in conjunction with the TAO operations on the cruise:

Pacific Marine Environmental Laboratory (PMEL) Argo Profiling CTD Floats

Six Argo floats were scheduled for deployment on this cruise. The chief scientist verified and briefed the Operations Officer on the deployment positions prior to the start of the cruise. All Argo Float deployments were completed as scheduled.

Questions concerning ARGO Floats should be directed to:

Gregory Johnson, NOAA/PMEL
Tel: (206) 526-6806
E-mail: pmel_floats@noaa.gov

or

Elizabeth Steffen, NOAA/PMEL
Tel: (206) 526-6747
E-mail: pmel_floats@noaa.gov

The following outlines the Argo floats deployed during the cruise:

ARGO Floats			
Site	Date	SN#	Comments
1700.794N 15301.240W	10/15/2008	3967	N/A
1500.036N 14946.954W	10/16/2008	4014	N/A
1259.890N 14635.113W	10/17/2008	4018	N/A
1100.024N 14324.963W	10/19/2008	4017	N/A
0003.064N 14003.287W	10/26/2008	4019	N/A
0059.277S 12436.136W	11/10/2008	4020	N/A

Atlantic

Oceanographic and Meteorological Laboratory (AMOL) Surface Drifting Floats

Ten AOML Surface Drifters were scheduled for deployment on this cruise. The chief scientist verified and briefed the Operations Officer on the deployment positions prior to the start of the cruise. All AOML Surface Drifter deployments were completed as scheduled.

Questions concerning AOML Surface Drifters should be directed to:

Shaun Dolk, NOAA/AOML
Global Drifter Center,
Tel: (305) 361-4546
Fax: (305) 361-4436
E-mail: shaun.dolk@noaa.gov

The following outlines the AOML Drifting floats deployed during this cruise:

AOML Floats			
Site	Date	SN#	Comments
0458.004N 13957.809W	10/23/2008	78834	N/A
0300.414N14004.751W	10/24/2008	78835	N/A
0002.992N 14003.255W	10/26/2008	78836	N/A
0300.267S 13956.645W	10/28/2008	78837	N/A
0500.529S 13955.919W	10/29/2008	78833	N/A
0456.940S 12456.535W	11/8/2008	78838	N/A
0259.301S 12454.689W	11/9/2008	78831	N/A
0008.827S 12423.397W	11/12/2008	78830	N/A
0258.674N 12430.129W	11/13/2008	78829	N/A
0457.738N 12434.484W	11/14/2008	78832	N/A

PCO₂ and Nitrate Mapping System and Nutrient Samples

Nineteen 30ml water samples were collected on this cruise. The chief scientist verified and briefed the Operations Officer on the specifications of the water samples to be collected during CTD casts prior to the start of the cruise. All water samples were collected as scheduled.

Questions concerning Nutrient Samples should be directed to:

Cathy Cosca
NOAA/PMEL
7600 Sand Point Way NE
Seattle, Washington 98115
Tel: (206) 526-6183
E-mail: cathy.cosca@noaa.gov

Low Nutrient Sea Water Samples

Sixteen 20-liter jugs were filled with low nutrient sea water collected using the ship's flow through system. These samples were collected between 20N and 5N along the ship's track.

Questions concerning the Low Nutrient Sea Water Samples should be directed to:

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